The Citrus Industry

Representative of Every Interest

Representing No Special Interest

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A-PEELING PAINT . . .

Pardon the pun, please. But Sandra Freeman, Florida Citrus Queen, is sitting on approximately 100 gallons of paint which is being used to paint Mutual's Lakeland headquarters building. Robert W. Rutledge, Mutual general manager, gives the paint a quick test before the painters start in on their work. The paint, incidentally, is made with Florida citrus peel oil and it's the first commercial use of this by-product of Florida oranges and grapefruit in paint.

VOL. 40 — NO. 10 OCTOBER, 1959 BARTOW, FLORIDA

An Important Announcement

from

BEN HILL GRIFFIN, JR.

We are proud to announce

the opening of our new

FERTILIZER FACTORY

in Frostproof

This new modern plant offers a complete fertilizer service for the Growers in this area.

BEN HILL GRIFFIN, JR.

GRIFFIN FERTILIZER CO.

E. R. JOHNSTON, Manager

M. J. Thompson — R. L. "Smokey" Padgett — Ray Joyner

FROSTPROOF, FLORIDA **TEL. 5111**

Production Costs Highest Of Record

Operating costs of citrus in 1957-58 increased 6 percent over the previous season and one percent over the previous high in 1955-56. Operating costs were at their highest in 27 seasons during the 1957-58 season as measured by citrus costs of production studies by the Florida Agricultural Extension Service and Experiment Stations.

An increase of 12 percent over 1953-54 brought the operating or

ZACH SAVAGE
AGRICULTURAL ECONOMIST
AGRICULTURAL EXPERIMENT
STATION, GAINESVILLE

cash costs to $206 per acre in 1954-55. A further increase of 4 percent brought the average cost to $215 per acre in 1955-56. This was an increase of 70 percent over 1949-50. Such costs on these bearing groves increased each season from 1939-40 to 1946-47—seven successive seasons—then decreased for three seasons to 1949-50. Since the latter season, there were increases in 1950-51 and 1951-52 over the preceeding season, then a slight decrease in 1952-53 followed by increases in each of the three seasons 1953-56, a decrease of 5 percent to $204 in 1956-57 and the 6 percent increase to $218 in 1957-58. See accompanying table.

Yields tended to increase over the period of these accounts, a portion of which was due to increasing average age of groves. Weather, economic and other conditions resulted in commercial yield fluctuations on these groves of mixed citrus —orange, grapefruit and tangerines. These accounts were started in 1931-32 and each of the first seven seasons averaged less than 200 boxes per acre when average ages of trees varied from 17 to 19 years. Yield averages were again less than 200 boxes during the three seasons of 1939-42 when average ages were 20 and 21 years. The yield was 305 boxes in 1943-44 with trees at 23 years of age. The average yield was below 300 boxes during the three succeeding seasons and 321 boxes in 1947-48 with three at age 25. In six of the nine seasons since 1947-48 the average yields were above 340 boxes, reaching 447 boxes in 1953-54 with average age at 30 years.

The following season, 1954-55, the yield averaged 356 boxes with tree age at 31 years.

The 1956-57 yield was 283 boxes, the lowest since 1949-50.

Yields by 5-year averages, returns above operating costs and average of trees were as shown in yield table.

The average yield for the five seasons of 1951-56 at 359 boxes per acre was almost three times the 5-year average of 1931-36, more than twice the 1936-41 average, 44 percent above 1941-46 and 14 percent higher than the 1941-51 average.

1956-57 Season

The yield in 1956-57 at 283 boxes per acre was the 11th highest of the 26 seasons on these groves, being exceeded in nine of the 10 seasons immediately prior to 1956-57, or 1946-56. Labor, power and equipment cost in 1956-57 at $116.14 per acre was the highest of the 26 seasons and more than four times such costs in each of the ten seasons of 1932-42 and more than three times such costs in each of the 13 seasons of 1931-44. Money spent for fertilizer materials averaged $55.80 per acre. This was the seventh highest such figure of these seasons and the lowest since 1950-51. Money spent for spray and dust materials averaged fifth highest in 1956-57 at $17.75 per acre. State and coun-

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Representing no special interest

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Preliminary Program 72nd Annual Meeting...Florida State Horticultural Society

The 72nd annual meeting of the of the Florida State Horticultural Society will be held in Miami, October 27-29. The Everglades Hotel will be headquarters for the meeting.

Complete arrangements for the general meeting of the Society have not been arranged, but it will be held Wednesday morning, Oct. 27th, at which time President S. John Lynch will deliver his annual address, and there is a possibility of another outstanding speaker to make another address on this occasion.

The annual business meeting of the Society will be held at this session, at which time officers for the year 1960 will be elected.

The annual banquet of the Society will be held on the evening of this date.

Session programs have been completed and are listed below:

CITRUS SECTION

Dan Richardson, Vice President Presiding

Tuesday Afternoon, October 27

2:00 — Additional Observations on Florida Citrus Following the 1957-1958 Freezes. Jack T. McCowen, Agricultural Extension Service, Gainesville.

2:15 — Chemical Control of Perennial Grasses in Citrus Groves. Dale W. Kretchman, Citrus Experiment Station, Lake Alfred.

2:35 — Pot Studies on the Effect of Superphosphates on the Growth of Citrus Seedlings. G. K. Rasmussen and P. F. Smith, U. S. D. A., Orlando.

2:55 — Effect of Lead Arsenate Sprays on Deadwood Yield, Fruit Size, and Drop of Marsh Grapefruit, E. J. Deszyck and S. V. Ting, Citrus Experiment Station, Lake Alfred.

3:15 — Present Status of Heat Treatment of Citrus Viruses. T. J. Grant, J. W. Jones and Gerald Norman, U. S. D. A., Orlando.

3:35 — Intermission.

3:45 — Leaf Drop Following Certain Spray Applications on Citrus. W. L. Thompson, Citrus Experiment Station, Lake Alfred.

4:05 — The Use of Tedion Against Citrus Red Mite and Texas Citrus Mite. R. B. Johnson, Citrus Experiment Station, Lake Alfred.

4:25 — Sectional Business Meeting.

Wednesday Afternoon, October 28

2:00 — Early History of the Temple Orange. Paul L. Harding, U. S. D. A., Orlando.

2:15 — Soil Application of Manganese for Citrus. C. D. Leonard and Ivan Stewart. Citrus Experiment Station, Lake Alfred.

2:35 — Studies on Root Absorption of Applied Cooper, Zinc, and Manganese by Citrus. P. F. Smith and G. K. Rasmussen, U. S. D. A., Orlando.

2:55 — Nitrogen and Potassium Fertilization of Valencia Orange Trees on Calcareous Soil. Herman J. Reitz and R. C. J. Koo. Citrus Experiment Station, Lake Alfred.

3:15 — Intermission.

3:25 — New Early Maturing Tangerine Hybrids. Phillip C. Reese and F. E. Gardner. U. S. D. A., Orlando.

3:45 — Factors Related to Cold Hardiness of Citrus (A Progress Report on new Research). G. S. Nijjar and John W. Sites. University of Florida, Gainesville.

4:05 — Citrus Breeding for Cold Hardiness. J. R. Furr, U. S. D. A., Indio, California.

4:20 — Efficiency of Equipment for the Application of Pesticides to Florida Citrus Trees. J. R. King, W. L. Thompson, P. J. Jutras and M. Cohen, Citrus Experiment Station, Lake Alfred.

Thursday Morning, October 29

9:00 — Budwood Importation — Its Dangers and Benefits. L. C. Knorr, Citrus Experiment Station, Lake Alfred.

9:20 — The Relation of Nursery Tree Size to Ultimate Size and Production in Citrus. F. E. Gardner, P. C. Reese, and G. E. Horanic, U. S. D. A., Orlando.

9:40 — Some Consideration Regarding Setting Distances. Zach Savage, Agricultural Experiment Station, Gainesville.

10:00 — Keeping Quality of Marsh Grapefruit after Nitrogen

and Potash Fertilization. Paul L. Davis and Paul L. Harding. U. S. D. A., Orlando.

10:20 — Intermission.

10:30 — Greasy Spot in Florida — Its Control and Apparant Cause. M. Cohen, Citrus Experiment Station, Lake Alfred.

10:50 — Promising Rootstocks that Tolerate the Burrowing Nematode. Harry W. Ford and William A. Feder. Citrus Experiment Station, Lake Alfred.

11:10 — Cold Hardiness Studies on Citrus. William C. Cooper. U. S. D. A., Orlando.

PROCESSING SECTION

W. Clifford Scott, Vice President Presiding

Tuesday Afternoon, October 27

2:00 — Prevention of the Butt Discoloration of Prepacked Celery. C. B. Hall, Agricultural Experiment Station, Gainesville.

2:20 — Observation on Celery Flavors. C. B. Hall, Agricultural Experiment Station, Gainesville.

2:40 — Dependable Vegetable Supplies for Canning in Florida. Jesse M. Huffington, Continental Can Company, Baltimore, Maryland.

3:00 — Measurement of Color Differences in Green Beans. A. L. Shewfelt, Canadian Department of Agriculture, Morden, Manitoba, and R. A. Dennison, Agricultural Experiment Station, Gainesville.

3:20 — Simulated Packing, Shipping and Marketing Experiments with Valencia Oranges. W. Grierson and F. W. Hayward, Citrus Experiment Station, Lake Alfred.

3:40 — Pack-Out as Affecting Profits of Fresh Citrus Packinghouses with Particular Reference to Fruit Color. W. Grierson, Citrus Experiment Station, and M. F. Oberbacher, Florida Citrus Commision, Lake Alfred.

4:00 — Sectional Business Meeting.

Wednesday Afternoon, October 28

2:00 — Comparison of Characteristics of Commercial Aqueous Extracts of Orange Pulp Produced from Midseason and Late Season Fruit.

2:00 — Part 1. Introduction and Some Characteristics. R. L. Huggart, R. W. Marron, and G. H. Ezell, Florida Citrus Commision and R. W. Olsen and F. W. Wenzel, Citrus Experiment Station, Lake Alfred.

2:20 — Part 2. Pectic Substances and Related Characteristics. A. H. Rouse, Citrus Experiment Station, and C. D. Atking and E. L. Moore, Florida Citrus Commission, Lake Alfred.

2:40 — Part 3. Microbiological Characteristics. E. C. Hill, Florida Citrus Commission, and Roger Patrick, Citrus Experiment Station, Lake Alfred.

2:50 — Part 4. Summary. F. W. Wenzel, Citrus Experiment Station, Lake Alfred.

3:00 — A Comparison of Characteristics of Commercial Frozen Concentrate Orange Juices Prepared by Florida Processors During Five Seasons, 1953-59. C. D. Atkins and E. L. Moore, Florida Citrus Commision, and A. H. Rouse, Citrus Experiment Station, Lake Alfred.

3:20 — Viscosity of Commercial Frozen Concentrated Orange Juices. George H. Ezell, Florida Citrus Commision, Lake Alfred.

3:40 — The Taste of Citrus Juice. 2. Citrate Salts and Tartness. Robert W. Kilburn, Florida Citrus Canners Cooperative, Lake Wales.

Thursday Morning, October 29

9:00 — Progress in Sectionizing Citrus Fruits. A Review. Gray Singleton, Salads - Shirriff - Sorsey, Inc., Plant City.

9:20 — Effect of Arsenation of Fruit on the Quality of Canned Grapefruit Sections. F. W. Wenzel, E. J. Deszyck, and R. W. Olsen, Citrus Experiment Station, and R. L. Huggart, E. L. Moore, and R. W. Barron, Florida Citrus Commision, Lake Alfred.

9:40 — Status of Research on Protection Against Insect Infestation of Dried Citrus Pulp in Storage. Burie W. Clements, Jr., Hagen B. Gillenwater, and Dean F. Davis, Stored Products Insects Laboratory, U. S. D. A., Savannah, Georgia.

10:00 — Hesperidin in Peel Extracts and Orange Juice by Ultraviolet Absorption. Rudolph Hendrickson, Citrus Experiment Station, Lake Alfred.

10:20 — A Study of the Degrees Brix and Brix-Acid Ratios of Tangerines Utilized by Florida Citrus Processors for the Seasons 1953-54 Through 1956-57, and 1958-59. G. F. Westbrook and E. C. Stenstrom, Citrus and Vegetable Inspection Division, Florida Department of Agriculture, Winter Haven.

10:40 — Should Oranges for Concentrate be Washed Before or After Storage Bins? D. I. Murdock and Charles H. Brokaw, Minute Maid Corporation, Orlando.

11:00 — Materials Balances in the Concentration of Orange Juice. W. Clifford Scott and Donald A. Morgan, U. S. Fruit and Vegetable Products Laboratory, Winter Haven.

KROME MEMORIAL SECTION

T. W. Young, Vice President Presiding

Tuesday Afternoon, October 27

2:00 — Growth Substances in Peach Buds. R. H. Biggs, Agricultural Experiment Station, Gainesville.

2:10 — Blueberry Breeding Progress. R. H. Sharpe, Agricultural Experiment Station, Gainesville.

2:20 — Chromosome Relations in Blackberries. J. S. Shoemaker and T. T. Sturrock, Agricultural Experiment Station, Gainesville.

2:30 — Effect of Placement of Fertilizer and Lime on Pecan Seedlings. W. K. Robertson, Nathon Cammon, Jr. and G. C. Horn, Agricultural Experiment Station, Gainesville.

2:45 — Chemical Studies on Roots and Leaves of Coconut Palms Affected by Lethal Yellowing. J. G. A. Fiskell, Agricultural Experiment Station, and A. P. Martinez, State Plant Board, Gainesville.

3:00 — Intermission.

3:15 — Rare Fruit Council Activities, 1958-59. Wm. F. Whitman and Mrs. Otto L. Churney, Rare Fruit Council, Miami.

3:30 — Training in Tropical and Subtropical Horticulture in Florida. H. S. Wolfe, University of Florida, Gainesville.

3:45 — Sectional Business Meeting.

Wednesday Afternoon, October 28

2:00 — Some Principles for Spraying Subtropical Fruit Plants. D. O. Wolfenbarger, Sub-Tropical Experiment Station, Homestead.

2:20 — Photographic Record of Top-Working Avocados. Wm. H. Krome, Homestead.

2:40 — Some Maturity Indices for Florida Avocados. Thurman T. Hatton and Carl W. Campbell, U. S. D. A., Miami.

2:55 — Storage and Ripening of Florida Avocados. Carl W. Campbell, U. S. D. A., Miami.

3:05 — Intermission.

3:20 — Boron Deficiency and Alternate Bearing in Avocados. R. W. Harkness, Sub-Tropical Experiment Station, Homestead.

3:35 — Conditions Affecting Commercial Mango Production in Martin County. David Sturrock, Sturrock Tropical Fruit Nursery, West Palm Beach.

3:50 — Illustrated Travelogue of Caribbean Region. Burt Colburn,

Florida Growers' Association, Homestead.

Thursday Morning, October, 29

9:00 — Florida and the Macadamia Nut. Kenneth D. Woodburn, Florida State Board of Conservation, St. Petersburg.

9:20 — Juice Content of Tahiti Limes on Various Rootstocks. F. B. Lincoln, Sub-Tropical Experiment Station, Homestead.

9:35 — Lychee Behavior, 1958-59. John K. Rice, Florida Lychee Growers' Association, Clermont.

9:50 — Storage of Fresh Lychees. Carl W. Campbell, U. S. D. A., Miami.

10:00 — Intermission.

10:15 — Effects of Different Levels of Nitrogen, Potassium and Magnesium on Growth of Lychees. J. N. Joiner, University of Florida, Gainesville.

10:30 — Observations on Lychees Grown in Pot Culture. Seymour Goldweber, Tropical Landscape Company, Kandall.

10:45 — Effects of Certain Plant Growth Regulations Upon Cold Hardiness of Lychees. M. H. Gaskins, U. S. D. A., Miami.

VEGETABLE SECTION

William P. Hunter, Vice President Presiding

Tuesday Afternoon, October 27

2:00 — Effects of Combining Hydrocarbon Insecticides with Parathion and Diazinon for Leafminer Control on Tomatoes. R. M. Baranowski, Sub-Tropical Experiment Station, Homestead.

2:10 — Preliminary Work with Systemic Insecticides on Tomatoes. R. M. Baranowski, Sub-Tropical Experiment Station, Homestead.

2:20 — A Microbial Pathogen for the Control of Certain Cabbage and Cauliflower Insects. E. G. Kelsheimer, Gulf Coast Experiment Station, Bradenton.

2:30 — Sevin: Present Status in Controlling Vegetable Insects. L. C. Kuitert; Agricultural Experiment Station, Gainesville.

2:40 — Control of Subterranean Cutworms in the Everglades. W. G. Genung, Everglades Experiment Station, Belle Glade.

2:50 — Phosphatic Insecticides and Parathion-Toxaphene Combinations for the Control of the Green Peach Aphid and Serpentine Leafminer on Potatoes. Emmett D. Harris, Jr., Everglades Experiment Station, Belle Glade.

3:00 — Intermission.

3:20 — Some Aspects of Seasonal Rainfall in Florida. Keith Butson, Agricultural Experiment Station, Gainesville.

3:35 — The Neutron Method of Measuring the Moisture Content of Florida Soils. L. C. Hammond, University of Florida, Gainesville.

3:45 — Sectional Business Meeting.

Wednesday Afternoon, October 28

2:00 — Head Formation of Cabbage as Effected by Low Temperatures . D. G. A. Kelbert, Gulf Coast Experiment Station, Bradenton.

2:10 — Inheritance of Fruit Cracking Resistance in a Tomato Cross. H. W. Young, North Florida Experiment Station, Quincy.

2:20 — The Production and Future of Hybrid Vegetables. J. R. Wall, U. S. D. A. Southeastern Breeding Station, Charleston, South Carolina.

2:50 — Response of Strawberries to Mulching with Plastic. B. D. Thompson, Agricultural Experiment Station, Gainesville.

3:00 — Intermission.

3:20 — Factors Affecting Specific Gravity of Potatoes. D. L. Myhre, Potato Field Laboratory, Hastings.

3:35 — A Comparison of Quick Tests on Florida Soils. H. L. Breland, Agricultural Experiment Station, Gainesville.

3:45 — Mechanical Aids and Equipment for Harvesting Vegetables in Florida. L. H. Halsey and E. S. Holmes, Agricultural Experiment Station, Gainesville.

4:05 — Post-Harvest Treatments of Strawberries and Radishes with Cobalt 60 Gamma Irradiation. B. D. Thompson, Agricultural Experiment Station, Gainesville.

4:15 — Spacing and Fertilization of Watermelons. L. H. Halsey, Agricultural Experiment Station, Gainesville.

Thursday Morning, October 29

9:00 — Herbicides for Tomatoes and Pole Beans. D. S. Burgis, Gulf Coast Experiment Station, Bradenton.

9:10 — Chemical Control of Weeds in Potato Fields. E. N. McCubbin, Potato Field Laboratory, Hastings.

9:20 — Vapam and VPM Soil Fumigants Must be Applied Properly to be Effective. D. S. Burgis and A. J. Overman, Gulf Coast Experiment Station, Bradenton.

9:30 — Virus Disease Resistance in Peppers. A. A. Cook, Agricultural Experiment Station, Gainesville.

9:40 — Factors Affecting Within-Field Spread of Aphid Borne Viruses. John N. Simons, Everglades Experiment Station, Belle Glade.

9:52 — Use of Combinations of Maneb and Dyrene for Control of Tomato Diseases. R. A. Conover and R. E. Stall, Sub-Tropical Experiment Station, Homestead, Indian River Field Laboratory, Ft. Pierce.

10:05 — Intermission.

10:20 — Maintaining the Genetic Stability of Vegetable Varieties. G. W. Scott, Associated Seed Growers, Inc., New Haven, Connecticut.

10:50 — Verticillium Wilt of Tomatoes in Dade County, Florida. R. A. Conover, Sub-Tropical Experiment Station, Homestead.

11:00 — Air Sprayer vs Boom Sprayer on Control of Early Blight in Celery. D. S. Harrison and P. L. Thayer, Everglades Experiment Station, Belle Glade.

11:10 — Compositional and Organoleptic Differences Between Celery Grown in Florida and California. C. B. Hall, Agricultural Experiment Station, Gainesville.

11:20 — Spacing and Fertilization of Watermelons. L. H. Halsey, Agricultural Experiment Station, Gainesville.

11:30 — Contamination of the Tomato Variety Manalucie. J. M. Walter and R. E. Stall, Gulf Coast Experiment Station, Bradenton and Indian River Field Laboratory, Ft. Pierce.

11:40 — Adjournment.

ORNAMENTAL SECTION

Philip J. Fleming, Vice President Presiding

Tuesday Afternoon, October 27

2:00 — Nitrogen and Light Intensity Requirements of Some Commercially Grown Foliage Plants. James Taylor, University of Florida, Gainesville.

2:20 — Effects of Varying Levels of Nitrogen and Potassium on Yield Keeping Quality, Intensity of Bloom Color and Foliar Composition of Chrysanthemum morifolium. T. Smith, University of Florida.

2:40 — Effect of Timing Application of Nitrogen, Phosphorous and Potassium on Growth and Flowering of Pot Grown Chrysanthemum morifolium var. Humdinger. James Taylor and J. N. Joiner, University of Florida, Gainesville.

3:00 — Symptoms of Nutritional Disorders of Chrysanthemum and Gladiolus. S. S. Woltz, Gulf Coast

(Continued on page 15)

Conner Tells of Mutual's Accomplishments

ADDRESS OF VERNON L. CONNER
CITRUS INSTITUTE — CAMP
McQUARRIE AUG. 13, 1959

Florida Citrus Mutual is a growers' organization. This is the basis upon which Mutual was formed, has operated and will operate in the future. To some, this may not seem like very much, but actually it is the whole basis for having a Florida Citrus Mutual. Then it follows—why have a Florida Citrus Mutual? My answer to this is that for the stability of the industry and forceful representation of the grower, a grower's organization is essential. The canners have an organization, the packing house managers have an organization, and in fact, just about every individual group that can be classified as such in the industry has an organization through which they are represented.

In the long and varied history of the Florida citrus industry, Florida Citrus Mutual is the only grower organization that has endured. It has endured and will continue its tremendous growth by following the basic philosophy that the Florida citrus grower must receive his fair share of the consumer citrus dollar and must be considered in all political and industry decisions.

No one part of the industry can possibly survive, year in and year out, if it does not make a profit. We have had good years in the Florida citrus industry and we have had bad years. Since we have had Florida Citrus Mutual, a greater understanding among all segments of the industry has been brought about and the 'dog-eatdog', 'wallow in the mud' psychology is practically gone. In other words, the Florida citrus industry today is big business. It is a businessmen's industry where decisions are made on a realistic basis, favoring no one segment of the industry over the other.

I am not saying here that we have reached the saturation point on understanding—we have not—but we have made progress and one of the most important things for your welfare, the growers' welfare in Florida, is that Florida Citrus Mutual continue to bring about decisions and information that will always leave the grower on an equitable footing.

VERNON L. CONNER
PRESIDENT FLORIDA CITRUS MUTUAL

Throughout the years Florida Citrus Mutual has embarked on virtually hundreds of individual programs and services for the grower. Many of these services are continued from year-to-year, but never are they continued without refinement and improvements. Some of these services include: daily marketing information to the grower through our daily market bulletin.

There is no way to over-emphasize the importance of this. There is not a fruit industry in the United State that can surpass or even equal this single important service of Mutual—what is the price today of fruit? How much was moved yesterday? What are the prospects tomorrow? We can answer these questions and many others on a day-to-day basis at Mutual. This information is used by many growers. But, most important, it is used by the people who make price and movement decisions.

These decisions used to be made on rumor, on suppositions, intrigue and falsehoods designed to 'rig' the market. I am glad to say these things can no longer affect the market because Florida Citrus Mutual gives the true, accurate, daily marketing picture. Some of us growers, after these things get started, take them for granted. Don't take them for granted. We would all suffer immeasurably without this kind of work.

Mutual has represented the grower on the state level of legislation and on the federal level of legislation. As this industry is growing, so are the problems in legislation that affect our welfare. We must inject ourselves into the political picture—because whether we like it or not, legislation and bureaucratic interpretations of legislation affect what we ultimately receive on the tree for our fruit.

Mutual is recognized throughout the agricultural world as one of the strongest legislative motivators on the agricultural scene today. The Florida citrus grower is known throughout the world as the best informed and the most forcefully represented group of any producer of an agricultural item. This did not just happen. It took years of hard work; it will take years of hard work to keep it this way. I am glad to report that Mutual now has 10,000 grower members. We are in a position to see that the grower is taken into account in all industry decisions before the Florida Citrus Commission and, for that matter, any group in the industry.

Our plans for the coming season are not yet completely formalized. A new program of progress will be presented to our board of directors in September. This new program, however, will include a revised and revitalized program to encourage and bring about the production of always better quality fruit—the shipping of quality fruit — and the manufacturing of quality citrus products.

Another part of our program will be to engage ourselves directly in the discovering of new citrus products and new uses for citrus products. In the past, Mutual has endeavored to try to bring these things about by indirection. This has not been completely satisfactory. We must find new uses—we must find

new ways too, to advertise and market our expected increased citrus crops. Along this line, as an experiment, Florida Citrus Mutual headquarters will soon be redecorated with paint made from citrus. This in itself could open up a new outlet for a citrus by-product.

Mutual, some years ago, brought about an awareness of the potential in export markets to the industry. I am glad to report that our new program will include not only the bringing about of increased exports, but as well, some new and dramatic announcements of how and where citrus will be used overseas. You see, as growers we can no longer be content with just growing fruit. We must follow that fruit from the bloom to the consumer—because fruit is never really sold until it is consumed.

Mutual too, next season, will supply its grower members with more complete and up-to-date on-tree price information than ever before. Next season, with the help of the Florida Citrus Commission, the Florida Citrus Mutual grapefruit spoon will again be promoted. Last year, about three million spoons were distributed throughout the United States. We have definite indication now that through the promotions of this spoon, grapefruit sales have been aided.

Supports Research

Next season, Mutual will follow through and do everything possible to see that the new Florida Citrus Research Foundation reaches its financial goal. We have already contributed $1 for every member of Florida Citrus Mutual. Again, here is a project for growers. A project to bring about new varieties of citrus that may be cheaper to grow; that may give the consumer more satisfaction. Here again then is an independent grower project without the aid of government handouts and as well without the restrictions that go right along with governmental intervention.

Actually, I get so enthusiastic in talking about Mutual, I could go on-and-on. Before that happens, I would like to make a few comments concerning the prospects for the coming season. Prospects for next season:—all present price determiners indicate a profitable season ahead for oranges, grapefruit and tangerines. It is a pleasure for me to compliment the concentrate industry on their recent announcement of supplemental advertising programs to help move the present concentrate inventory. Actually, they have committed themselves to spend an additional three million dollars during the coming months to profitably move concentrate now in inventory. This is something that could not have been done too many years back.

Again it is a sign of a grown-up industry desiring to sell its products rather than to give them them away—which has been done so many times in the past. With this added promotion, Florida Citrus Mutual expects, more than ever, that the concentrate inventory at the end of the season will be about 14 million gallons. This will put everyone in a workable position to begin next season.

The expected production of Florida oranges is much more favorable now than it was last year at this time, principally because of ideal growing conditions since the bloom. Fresh fruit shipments of oranges this next season will increase substantially. The use of oranges for concentrate will decrease in proportion to the over-all total as compared to this season. So, next season we can look forward to a more in-balance position in the utilization of oranges. This is healthy; this is needed; this is going back to a more normal marketing situation.

Grapefruit prospects, I am sorry to say, for the present year, as far as production is —concerned, are not nearly as good as oranges. In other words, it looks as though we will have less grapefruit this coming season than we have just finished marketing. Inventories of grapefruit juice and sections are in a favorable position.

Tangerines, because of growing conditions, probably will be easier to move than in many past seasons. So at the present time, we have good prospects for next season. And this again is where Mutual comes in. Mutual will do everything humanly possible to see that the grower realizes his share of these prospects. If this is not done, Mutual has no excuse for existence. So I can assure you here and now that these things will be done.

I want to congratulate Bob Norris on behalf of Florida Citrus Mutual for his untiring, unselfish efforts in the development of this institute and for the many other splended things he has brought about for Florida growers. He has done a grand job and I assure you it is recognized and appreciated.

FLORIDA SOUTHERN STARTS COURSE IN CITRUS PACKING HOUSE PROCEDURES

Florida Southern College has announced that the course in Citrus Packing House Procedures will again be offered in the evening Community College for the fall semester.

The course will be taught by Dr. W. Grierson of the Citrus Experiment Station, Lake Alfred, by special arrangement with the University of Florida.

The course is being expanded to two semesters. The first semester will cover the techniques of fruit handling with particular attention given to new approaches in bulk handling, automatic packing and hydrocooling.

The second semester will include administrative aspects with emphasis on the current status of color-add, post-harvest fungicides and possible effects of federal food additives legislation.

The three-hour class will begin on Tuesday, Sept. 29, at 6:30 p.m. and continue to meet on each subsequent Tuesday of the term.

Complete details on the course may be obtained at the office of Registrar E. A. Lilley in the Watson Administration Building.

better fruit, better yields when you protect against mites

with low-cost

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SAFE • EFFECTIVE • RESIDUAL • MITICIDE

Yes, get bigger yields, better fruit, and more profits. CHLOROBENZILATE *stops mites.* And due to its long residual action, CHLOROBENZILATE *continues to protect!* Here's real low-cost mite control for citrus crops.

CHLOROBENZILATE, developed by Geigy research laboratories, is easy to use, safe—because it is relatively non-toxic to man and animals, and does not affect bees under normal field conditions. It is compatible with most commonly used insecticides and fungicides. It may be used with spray oils and is non-irritating to skin.

CHLOROBENZILATE provides outstanding control of *Citrus Bud Mite, Citrus Flat Mite,* and *Citrus Rust Mite.* CHLOROBENZILATE is effective against all growth stages of mites and has strong ovicidal properties. It is valuable in controlling strains of mites resistant to organic phosphorus insecticides.

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Quality In Citrus...What The Concentrate Industry Wants

W. R. ROY
VICE PRESIDENT, TECHNICAL SERVICES
MINUTE MAID CORPORATION
ORLANDO, FLORIDA

Most specifications of fruit for concentrate purposes state, "Only sound, mature, sweet oranges will be used for production of frozen concentrated orange juice". Specifications often go farther than this in defining minimum "maturity" as 10.5 to 1 Solids/Acid ratio and in limiting varieties.

Experience in production of concentrated juices gained over the past 13 years has pointed out that some of the characteristics most desired in fruit for concentrate are difficult or almost impossible to cover in a specification. These factors will be discussed in this paper.

Packinghouse Eliminations vs. Grove Run Fruit

When frozen concentrate production began in Florida in 1946, most of the fruit available for the concentrate plant consisted of packinghouse eliminations. As production of frozen orange concentrate increased, the demand for fruit far exceeded that available from this source; today, as a result, only a relatively small percentage of concentrate fruit comes from the packinghouse.

Eliminations are still used, but it is recognized that such fruit requires more careful grading than grove run fruit. Eliminations are usually several days off the tree, control of ratio is more difficult in such fruit because of heterogeneity of loads, and use of excessive amounts of eliminations can contribute to "old", "stale", and other unwanted flavors.

Maturity

The most desirable range of ratios of soluble solids to acid in frozen concentrated orange juice is 14 to 1 to 16 to 1. While these ratios can be obtained commercially by blending low ratio fruit with high ratio fruit, it must be recognized that some of the off-flavor contributed by either or both extremes do not cancel each other, but carry through to the final product.

Extreme care must be exercised in using fruit in the lower bracket of the maturity range lest immature flavors are introduced into the product. This is particularly true in early season production when many loads of fruit are available at a marginal (10.5 to 1) ratio. Early varieties and even midseason varieties often taste green, unripe, immature or even bitter, with ratios as high as 12 to 1. In this regard, therefore, it would be to the grower's advantage, as well as the processor's, to permit fruit to hang on the tree to full flavor maturity, as well as ratio maturity, to insure development of optimum flavor.

The advantage to be gained by the processor is obvious quality-wise. The advantage to the grower lies in the increase in solids and the better price obtained from the greater "pounds solids" associated with full maturity.

Purchase of Fruit by "Pounds Solids"

This writer, in 1949 and 1950, broached the subject of purchasing fruit for concentrate manufacture on the basic of its solids content, rather than by the box. The soundness of this concept has been proven by its adoption by all processors, and its acceptance by growers, at this writing.

At the risk of boresome repetition, let us review the reason for this method of purchase. Table I. demonstrates the pounds solids and gallonage yield of 42° Brix concentrate from juice of 10° Brix to 14° Brix, assuming a constant yield of 5.5 gallons of juice per box.

TABLE I.

Relationship Of Degrees Brix Of Raw Fruit To Yield Of Concentrate (Assuming 5.5 gallons of juice per box of fruit)

°Brix	Pounds Solids per Box	Gallons 42° Brix Concentrate
10°	4.76	1.15
11°	5.26	1.26
12°	5.76	1.38
13°	6.26	1.50
14°	6.77	1.63

From the data in Table I. it becomes obvious that sale of fruit on a "pounds solids" basis rather than on a "per box" basis would return to the grower 40% more for 14° Brix than for 10° Brix fruit. The processor, in turn, would prefer to pay this premium for fruit because he handles less fruit for the greater yield in his plant. These figures are based on the fact that a gallon of 42° Brix concentrate always contains 4.156 pounds solids.

The processor, therefore, desires fruit of a high solids content, the higher the better, and he is glad to pay a premium for this type of fruit.

Relation of Fruit Sizes to Solids

Many publications have pointed out the factors that contribute to a high solids content, such as rootstock, varieties, location. These factors may be regarded as "uncontrollable" to the extent that established groves, with fixed varieties and other conditions, such as weather, cannot be altered to increase solids.

Harding (USDA Tech. Bul. No. 753, Dec. 1940) pointed out that, of the early varieties, Parson Brown oranges grown on sour orange rootstock contain the highest soluble solids content, followed in order by Parson Brown, Boone, Hamlin and Sixteen-to-One, grown on rough lemon stock. Of the midseason fruits, the order was found to be Seedling, Conner and Jaffa, followed by Pineapple and Homosassa, with the more mature fruits containing highest solids. He demonstrated the effect of rootstock also on Valencia oranges, with fruit grown on sour orange stock showing a higher solids content than fruit grown on rough lemon stock.

The same author has reported that, as a rule, smaller fruits contain more solids and acid than larger fruit, and, on the basis of a packed box (1-3/5 bushel), a greater volume of juice. This fact is of considerable importance when fruit is grown specifically for concentration, since more solids and more juice in the small fruits will contribute more solids per box. In other words, a greater amount of concentrate can

(Continued on page 14)

QUALITY IN CITRUS . . . WHAT THE CONCENTRATE INDUSTRY WANTS

(Continued from page 12)

be made from small fruit from the same weight or volume of large fruit.

Control of Solids

There are some factors that may serve to control solids content, within limits. Many efforts to increase either solids content of fruit, or juice content, through the medium of fertilizing, have been unrewarding. Some work has been done, however, which indicates that fruit solids yield per acre can be increased by proper control of the potash content of the leaves, which, of course, is influenced by soil applications of this element.

Willson and Arey (Fla. Hort. Soc. Proceedings 71, 181-186 1958) demonstrated the following:

1. High solids in fruit from Pineapple and Valencia orange groves are associated with low leaf potassium.

2. Small sizes of fruits were correlated with low potash content of leaves.

3. The solids in one sixty-acre block could have been increased by 8900 pounds by lowering leaf potash level.

Attainment of the proper level of leaf potassium requires very careful control of the potash in the fertilizer monitored by frequent leaf analysis, since application of potash at too low a level produces undesirable physiological effects in the tree. Unless such control is exercised, potash deficiency can result. Willson and Arey recommended a level of 1.0% potassium in five to seven month old spring flush leaves.

Fruit Damaged by Freeze

Up to the freeze year of 1957-58, concentrators had consistently resisted or refused to process fruit which was damaged by freeze. Prior to that time the industry had experienced local freezes almost annually, but there had always been available a plentiful supply of undamaged fruit from areas untouched by freezing temperatures. In that year, however, the concentrate industry was faced with a decision either to utilize such fruit or close down, since such a large percentage of fruit showed some degree of damage. The undamaged fruit remaining was not in sufficient supply to keep the plants in operation.

It was found that by modification of extractor pressures and use of finishing procedures that essentially eliminated pressure and abrasion of the pulp, a good quality juice could be obtained from freeze damaged fruit.

Fruit which has undergone moderate damage due to freezing exhibits dry cells in the stem end; the severity of damage is indicated by the depth of drying. In addition, the cells become much more fragile and break up more easily in the extraction and finishing processes. This, in turn, releases large amounts of pectic enzyme and pectin into the extracted juices so that, using conventional methods of extraction and finishing, the juice so obtained is extremely unstable physically; it is thick and tends to gel and separate when mildly abused.

New extraction techniques were developed which avoided the disintegration of the pulp during the unit processing, and a surprisingly high quality juice was made during the year.

Fermented or dropped fruit, of course, cannot be used, and when freeze damage is so severe as to cause fermentation or dropping, the fruit is a total loss as far as concentrate operations are concerned.

Yield of juice is considerably reduced as a result of freezing, the loss in yield being proportional to the extent of drying following the freezing. Judgment must be exercised to eliminate fruit so dry that processing is uneconomical to grower and processors. Also to be avoided is fruit which, as a result of excessive drying, exhibits off-flavors such as mustiness or hay flavors.

While concentrators would prefer not to use fruit damaged by cold in their operation, it was demonstrated that it is possible to utilize a large proportion of this fruit and still maintain quality in the finished product.

Fruit Juice Color

It is well known that the juice color of commercial varieties of oranges grown in Florida varies from pale yellow in early varieties through pale orange in midseason varieties, to the deep orange color of mature Valencias. Early in concentrate history, it was learned, by sad experience, that once a consumer had consumed concentrate made from Valencia oranges, he thereafter resisted purchase of concentrate made from the paler early varieties.

To minimize the wide variation in color due to use of seasonal varieties of fruit, the industry found it necessary to blend concentrates in such a way that product made from the early varieties of fruit contained fairly large quantities of Valencia concentrate. This practice makes it necessary to carry over to the following December, January and February large gallonages of Valencia concentrate produced earlier in April, May or June. Carryover of Valencia concentrate of sufficient volume to insure good color in early production is expensive, requiring tie-up of large inventories for many months. In addition, it imposes an additional processing burden. Very careful handling (freezing and thawing) of the bulk concentrate is necessary to avoid development of off-flavors and to maintain good physical stability.

The only apparently satisfactory solution to this color problem would reside in development and availability in suitable volume, of an early variety of orange which exhibits a good deep juice color as well as good flavor, early maturity, and preferably good solids. Some of the hybrids now under study appear promising for this purpose, but volume production of this type of fruit is several years away.

Exterior Appearance

Most exterior or surface defects which might cause rejection of fruit for fresh channels are of little concern to processors, since they have little effect on the interior of the fruit. Insect damage such as rustmite, scab, or other defects such as sunburn or spray burn, do not affect interior quality to any great extent. However, any insect or mechanical damage that punctures the skin of the orange, and thus permits entry of bacteria, is to be avoided, and fruit of this nature is graded out.

Scale often causes trouble in concentrate operations because it sometimes becomes detached from the fruit during extraction and shows up in the final product as a defect or "foreign matter". Control of scale by some of the newer scalicides is desirable and preferable to use of oil sprays for the purpose. It has been shown that use of oil causes a depression in fruit solids content, but that solids are not affected by the newer scalicides.

Solids Content Related to Season

There are "vintage" years in the orange crop and the concentrate

industry similar to "vintage" years common to the grape and wine industry. Seasons when high total soluble solids are characteristic of the crop yield concentrate with a higher flavor level than when the average fruit solids are low.

For instance, the season just completed, 1958-59, was characterized by average fruit solids greater than the industry had experienced in the nine years preceding, and it is generally conceded that the concentrated product made during the year was of excellent quality.

Figures supplied by the Florida Department of Agriculture list the following weighted averages for oranges received at processing plants.

TABLE II.

Seasonal Averages of Brix Values of Juice From Oranges Delivered To Processing Plants

Year	% Total Solids (° Brix) Season Averages
1949-50	11.23
1950-51	11.30
1951-52	11.88
1952-53	12.03
1953-54	11.47
1954-55	11.97
1955-56	11.76
1956-57	12.09
1957-58	11.47
1958-59	12.21
Ten Year Average 1949-59	11.74

(42° Brix concentrated reconstituted at 3+1 yields juice of 11.9° Brix)

"Vintage" years are those in which growing conditions, weather, rainfall, etc. are favorable to development of good flavor and high solids in the fruit. When these conditions occur, a greater amount of solids can be contributed to the concentrate by means of cutback, with attendant greater flavor and aroma.

It will be noted from the data presented in Table II. that the ten year average for juice solids is 11.74° Brix. There is a general trend toward increasing solids, probably due to improvement in cultural practices as discussed earlier, although some of the general increase may be because of a general tendency on the part of the industry to plant betted juice varieties of fruit.

Interestingly enough, 42° Brix concentrate, reconstituted by adding three volumes of water to one volume of concentrate (as recommended) yields juice of 11.9° Brix. The average juice Brix delivered to processors during the past five years (1954-59) was 11.9°. It is apparent that the choice of 42° Brix concentration for the frozen product, and reconstitution ratio of 3+1 was a wise and proper one.

PRELIMINARY PROGRAM 72nd ANNUAL MEETING FLORIDA STATE HORT. SOCIETY

(Continued from page 7)

Experiment Station, Brandenton.

3:20 — Adaptation of the Comber Acidity Test for Soluble Iron in Azalea Soils. Seton N. Edson and John V. Watkins, University of Florida, Gainesville.

3:40 — Pre- and Post-Emergence Herbicides on Gladiolus. Donald S. Burgis, Gulf Coast Experiment Station, Bradenton.

4:00 — Evaluation of Plastic Films for Temporary Greenhouses in Florida. E. W. McElwee and T. J. Sheehan, Agricultural Experiment Station, Gainesville.

Wednesday Afternoon, October 28

2:00 — Effect of Different Pots and Frequency of Watering on Growth of Snapdragons, Petunias and Calendulas From Seedling Stage to Maturity. J. M. Joiner, University of Florida, Gainesville.

2:20 — Effect of Potting Media and Watering Time on Growth of Formosa Azalea and Wax Privet in Containers. R. D. Dickey, University of Florida, Gainesville.

2:40 — Effects on Various Pots, Mist and Rooting Methods on Propagation of Philodendron oxycardium and Peperomia spp. Jake Gruis, University of Florida, Gainesville.

3:00 — Rooting and Bud Growth Response of Philodendron oxycardium to Various Levels of Gamma 3-Indole-N-Butyric Acid, 1-Napthaleneacetic Acid and Surrose, J. N. Joiner, University of Florida, Ganiesville.

3:20 — Vegetable Propagation of Feijoa sellowiana and Rhodomyrtus tomentosa as Affected by Various Combinations of Indolebutyric Acid, Arginine, Sucrose, and Thiamine. John Taylor, University of Florida, Gainesville.

3:40 — Effects of Light Duration and Planting Dates on the Flowering of China Asters. T. J. Sheehan and S. A. Rose, University of Florida, Gainesville.

4:00 — Production of Tree Roses on Rosa fortuneana Stock. S. E. McFadden, Jr., Agricultural Experiment Station, Gainesville.

4:20 — Irradiation Studies on Chrysanthemums and Gladiolus. T. J. Sheehan and Y. Sagawa, University of Florida, Gainesville.

Thursday Morning, October 29

9:00 — Further Studies on Geotropism of Snapdragons and Gladiolus. H. J. Teas and T. W. Holmsen, University of Florida, Gainesville.

9:20 — The Kidney-Shaped Nematode, Rotylenchulus n. sp., the Possible Cause of 'Lethal Yellowing' Disease of the Coconut Palm. L. G. van Weerdt, A. P. Martinez, and R. P. Esser, State Plant Board, Gainesville.

9:40 — Chemical Studies on the Roots and Leaves of Coconut Palms Affected by "Lethal Yellowing.' J. G. A. Fiskell, University of Florida, A. P. Martinez and L. G. van Weerdt, State Plant Board, Gainesville.

10:00 — Cymbidium Mosaic in Orchids. M. K. Corbett, Agricultural Experiment Station, Gainesville.

10:20 — Scale Insect Control on Ornamentals. L. G. Kuitert and S. H. Kerr, Agricultural Experiment Station, Gainesville.

10:40 — Control of Nematodes on Woody Ornamentals with Soil Fumigants. H. N. Miller, Agricultural Experiment Station, Gainesville.

11:00 — Poinsettia Bacterial Stem Rot. L. A. McFadden, Sub-Tropical Experiment Station, Homestead.

11:20 — Inoculation Studies with Corynebacterium poinsettiae. D. B. Creager, State Plant Board, Gainesville.

How To Handle The Fall And Winter Mite Problem

BY
ROGER B. JOHNSON AND
W. L. THOMPSON

W. L. THOMPSON

Two events of immediate concern to Florida citrus growers have occurred in recent weeks. The first of these was the sudden availability of the miticide Delnav, while the second was the unexpected announcement that the petition for a residue tolerance for Tedion on citrus fruit had been denied by the Food and Drug Administration. Delnav may now be used on bearing grapefruit, lemons, limes, oranges, tangelos, and tangerines while the use of Tedion must still be restricted to trees without fruit.

The first announcement aroused only slight interest, for Delnav had received little prior publicity, but the second was disappointing to those citrus growers who had discovered the value of Tedion through actual use under an Experimental Sales Permit. These growers and others who had expected to use Tedion this fall and winter, must now revise their mite control program. The availability of Delnav is now of greater interest and importance, and growers need to know how it compares with other miticides. This article presents this comparison and suggests how each miticide may best be used.

Miticides should be classified into three groups, as follows: (1) those that control purple mite and Texas citrus mite, (2) those that control only citrus rust mite, and (3) those that are more or less effective against all three species. The first group includes Tedion, Systox, and DN Dry Mix No. 1. In the second group we have zineb and, of course, sulfur. The third group includes Trithion, Kelthane, Delnav, and Chlorobenzilate. The third list includes most of the newer and, because they may serve a dual purpose, the more interesting materials. Let's consider their use in some detail.

Trithion is recommended at dosages of 0.5 to 1.0 pint of Trithion 4 Flowable or 1.0 to 2.0 pounds of a wettable powder formulation per 100 gallon. The greater dosage is required for consistently adequate post-bloom and summer control of rust mite. This is currently too costly. The lower dosage, however, has been quite satisfactory during the fall and winter. Fall and winter are also the seasons when control of purple mite is most urgently needed. Since Trithion also gives good control of this mite at this time of the year, it follows that this material can best be used in a mite control program that would include zineb or some other material in the post-bloom spray, zineb in the summer and Trithion in the fall.

The miticides Kelthane and Delnav differ somewhat in effectiveness from Trithion, but fit into the mite control program in a similar manner.

Chlorobenzilate, however, is entirely different. Although somewhat less effective than zineb against rust mite, it is superior to sulfur. Against purple mite and Texas citrus mite, it is of only slight value. It is therefore primarily a rust mite miticide while Trithion, Kelthane, and Delnav are primarily purple mite miticides. Chlorobenzilate is thus of greatest value in the post-bloom and summer sprays when rust mite is most important and purple mite control is of secondary interest.

When these facts are applied to this fall and winter, we find that Trithion, Kelthane, and Delnav may

ROGER B. JOHNSON

be used without a supplement for rust mite control; either sulfur or Chlorobenzilate must be used with DN Dry Mix; and zineb, Chlorobenzilate or sulfur are needed with Tedion.

Now we come to the question of which miticide or mixture to use this fall and winter. Each will be discussed in detail, but first, a few general comments seem to be in order. One often hears that this or that miticide will last all winter and more specific intervals are sometimes quoted. Although some, if not all of our miticides may produce such results, we cannot predict when they will occur. The interval of control depends not only on the miticide itself, but also on the thoroughness of application, weather, the severity and persistence of the mite problem, date of treatment, and perhaps other factors as well. If there is a severe and persistent outbreak of purple mite this winter, only Tedion is likely to last from October to post-bloom. If the mite problem remains fairly mild, however, such results may be obtained with other miticides. Furthermore, if mites must be controlled early in the fall, there is less chance of control lasting until after bloom than there is from sprays applied after December. Therefore, the most effective miticide should be used in early sprays because it offers the best chance of saving an applica-

(Continued on page 24)

Guide To The Selection Of Air Compressors And Electric Generators To Operate Power Pruning Tools

BY
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A. H. KREZDORN

There is a growing interest in mechanical pruning in Florida citrus production. Mechanical hedging is generally accepted in the Ridge District and power hand tools are being used more and more to perform the complementary selective type of pruning work. Two general types of hand tools are used: air and electric. Air compressors are either engine-driven or PTO-driven. Electric generators are generally engine-driven.

It is usually simple for the grove manager to decide on the size of a generator assembly, as this will depend on the number of electric saws operated from the generator and the power rating of the individual saws. For example, five saws each rated at 500 watts would operate satisfactorily off a 3,000 watt (three kilowatt) generator of the same voltage with a factor of safety of 500 watts or 20%. Universal motors, used on most electric tools, take DC or AC and do not require high generator capacity for starting. A DC generator with manual starting is ideal for this kind of work. It is lighter and less costly than an AC generator on a per kilowatt basis, but cost of operation is about the same.

With air tools, however, a basic knowledge of air equipment is necessary to ascertain that the equipment is powered correctly and affords good performance.

Air tool manufacturers specify the **pressure range** under which the machine will best perform, together with the **volume of air consumed** in terms of cubic feet of **free air** per minute (such as "150 to 170 p.s.i. and 12 to 30 c.f.m. of free air").

On the other hand, small compressors are rated on a piston displacement basis (such as "maximum pressure: 200 p.s.i..—Displacement: 45 c.f.m."). The amount of free air delivered by a compressor will range from 50 to 90% of the piston displacement. This percentage is termed "volumetric efficiency" and is higher for two stage than for single stage compressors of the same clearance[1] and the same pressure range.

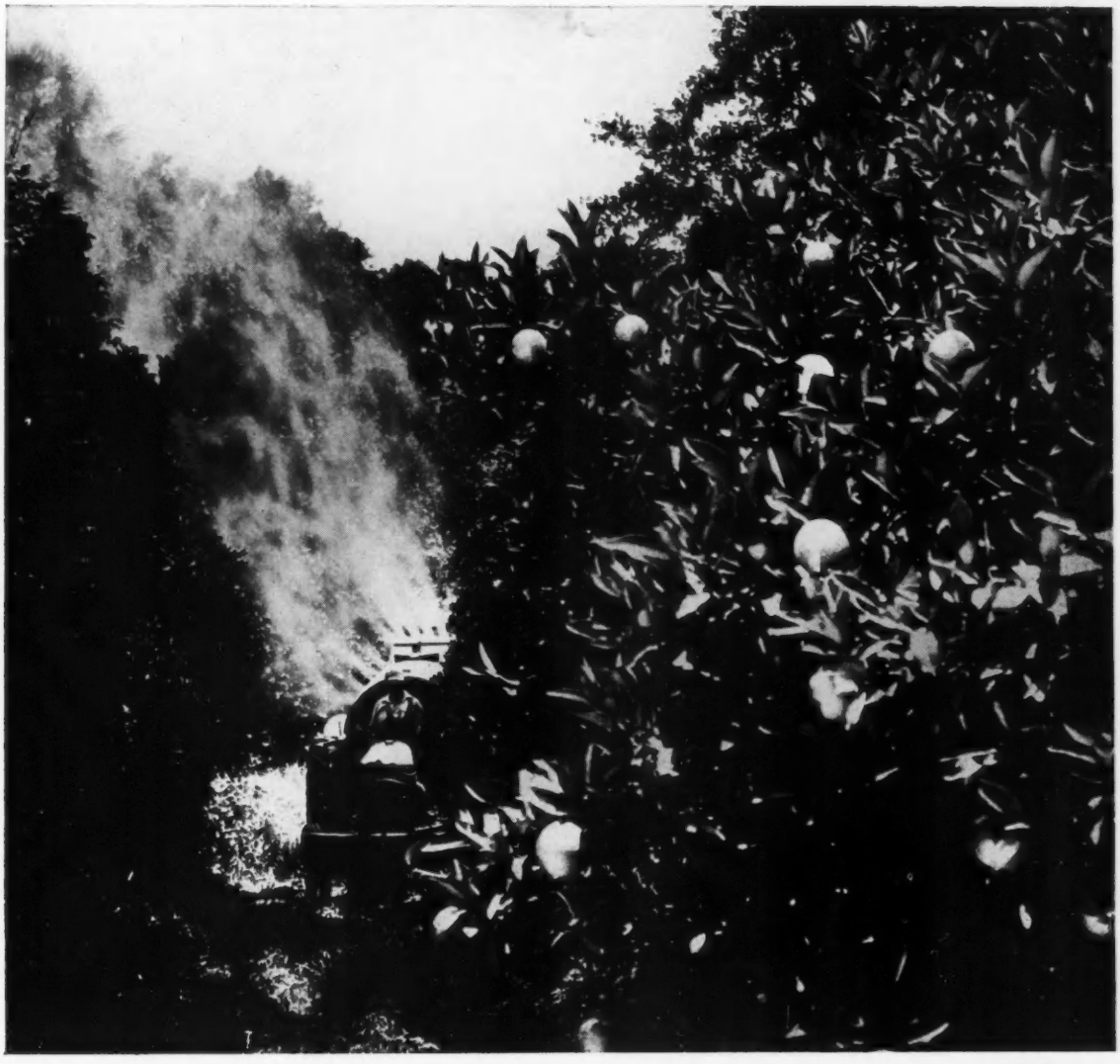
Two stage compressors are recommended for pressures in excess of 150 p.s.i. for continuous service. They are equipped with two cylinders, one large, one small. The air is first compressed in the large cylinder (low pressure cylinder), then discharged into the small cylinder (high pressure cylinder) through an intercooler. There, it is compressed to the desired pressure. By separating the stages thus, and cooling the air between the stages, power requirements are lower and proper lubrication of cylinders and pistons can be maintained.

Air compressed above atmospheric pressure will not hold as much moisture as free air. Condensation should therefore be allowed to settle before the air reaches the outlet piping. This function is taken over by the receiver tank. The tank also serves as an air reservoir; it equalizes the pulsations coming from the compressor; it colllects grease held in suspension by the compressed air as it leaves the compressor, it reduces the friction of air in the pipe system, and cools the air before it enters the transmission system. Water and grease should therefore be drained from the tank occasionally. A tank capacity of approximately 10 gallons is satisfactory for average conditions (air consumption up to 35 or 40 c.f.m.). It should have an ASME National Board working pressure of 200 pounds. A 200 pounds pressure gauge should be attached to the tank.

Compressor assemblies for pruning may be engine or PTO driven. In either case, they should be equipped with constant speed control (unloader), such as that which

(Continued on page 25)

[1]Clearance is the space between the piston and the cylinder head when the piston is on top dead-center position.



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PRODUCTION COSTS HIGHEST OF RECORD

(Continued from page 3)

ty taxes at $11.90 per acre were third of these seasons and more than twice that for 10 seasons.

Operating costs per acre averaged $204.39, the fourth highest of the 27 seasons. This figure was more than three times such cost in 10 of these seasons and more than twice that for 13 seasons. Interest at 6 percent on estimated grove valuation was $67.75 per acre in 1956-57. This figure was exceeded in 1957-58 only.

Total cost at $272.14 per acre in 1956-57 was fourth highest of the 27 seasons and more than twice that for 13 seasons. Much of these increases in costs were due to decreases in the value of the dollar. Some of the increases were due to increasing age of trees requiring added expenditures for most of the items.

Yield and Per-Box Cost

Increased yields tended to offset increases in per-acre costs. An operating cost of 51 cents per box in 1931-32 was not exceeded until 1944-45 when a hurricane lowered the yield. Other seasons when this figure was exceeded were in 1946-47 at 55 cents, 1954-55 at 58 cents, 1955-56 at 74 cents and 1956-57 at 72 cents. There were eight seasons when such costs were less than 40 cents, six from 40 to 45, nine from 50 to 55 and three 58 cents and above. Cost per box with interest on grove included was highest in 1955-56 and 1956-57 at 96 cents with 1933-34 third at 91 cents. The season with lowest such cost was 1943-44 at 41 cents. The 26-year average was 63 cents.

On-Tree Price

The on-tree price received for fruit in 1956-57 was $1.14 per box. This was 11 cents more than the average for the 26 seasons and there were only five seasons when such price was higher; 1942-43, 1943-44, 1944-45, 1945-46 and 1949-50. The price was the same ($1.14) in two other seasons, 1948-49 and 1950-51. The highest price received was $2.02 in 1944-45 and the average for the 26 seasons was $1.03.

Receipts per acre in 1956-57 were $322.36 which ranked eleventh among the 26 seasons and was 27 per cent more than the average of $253.39. Receipts per acre for the five seasons of 1952-57 varied from $321.45 in 1954-55 to $328.86 in 1955-56. The spread between the high and low seasons during this period was only $7.41 per acre. It is seldom that the combination of price and yield is such as to result in total fruit receipts per acre varying so little during five successive seasons.

Net Returns

Returns above operating or cash per acre were $117.97 in 1956-57. There were 15 of the 26 seasons with a lower figure than this. The distribution of these seasons by returns above operating costs were:

Less than 0 per acre 2 seasons
0 to $ 49 5 seasons
$50 to 99 6 seasons
100 to 199 6 seasons
200 to 299 2 seasons
300 to 399 3 seasons
400 to 499 2 seasons

There were two seasons when returns did not pay operating costs. During 13 seasons, 50 percent, the average returns above operating costs was less than $100 per acre.

When including interest on the estimated grove investment as a production cost, the figure for net returns is lower than returns above operating costs by the amount of such interest. The distribution of these seasons by net returns per acre were:

Less than 0 per acre 6 seasons
0 to $ 49 7 seasons
$ 50 to 99 6 seasons
100 to 199 1 season
200 to 299 2 seasons
300 to 399 4 seasons

The average net returns per acre for the 26 seasons was $97.30.

Capitalized at 6 percent, returns above operating costs in 1956-57 represented an average investment or value of $1,966 per acre. The corresponding value for the 26 sea-

Seasons	Age of Trees	Yield per acre	Returns above operating costs
1931-36	18	126	36
1936-41	19	175	44
1941-46	23	250	322
1946-51	26	314	181
1951-56	30	359	117

DATA BY SEASONS FOR GROVES OVER 10 YEARS OF AGE, 1952-58

	1957-58	1956-57	1955-56	1954-55	1953-54	1952-53
Number of Grove Records	169	161	158	170	179	198
Total Acres of Groves	6955	6729	6644.3	6513	6838	6969
Average Acres per Grove	41	42	42.1	38	38	35
Average Age	33	33	32	31	30	29
Number of Trees per Acre	61	61	61	61	61	61
Percent Trees Grapefruit	27.0	28.0	27.5	30.3	28.6	29.7
Boxes Harvested per Acre	*	283	292	356	447	344
Costs per Acre:						
Labor, Power & Equipment	$108.68	$116.14	$100.44	$ 91.31	$ 84.64	$ 81.01
Fertilizer Materials	61.56	55.80	59.81	66.43	60.61	55.89
Spray and Dust Materials	20.55	17.75	20.10	23.36	19.61	17.63
State and County Taxes	13.41	11.90	12.74	11.72	11.34	11.04
Miscellaneous	13.36	2.80	21.88	13.61	7.80	4.71
Total Operating Costs	217.56	204.39	214.97	206.43	184.00	170.28
Interest on Grove Valuation at 6%	68.09	67.75	65.82	65.82	62.91	61.07
Total Cost without Owner Supervision	285.65	272.14	280.79	272.25	246.91	231.35
Returns Per Acre						
Returns from Fruit	*	322.36	328.86	321.45	323.98	325.74
Net Returns	*	50.22	48.07	49.20	77.07	94.39
Returns above Operating Cost	*	117.97	113.89	115.02	139.98	155.46
Costs per Box:						
Labor, Power & Equipment		.41	.35	.26	.19	.24
Fertilizer Materials		.20	.21	.19	.14	.16
Spray and Dust Materials		.06	.07	.06	.04	.05
State and County Taxes		.04	.04	.03	.02	.03
Miscellaneous		.01	.07	.04	.02	.02
Total Operating Costs		.72	.74	.58	.41	.50
Interest on Grove Valuation at 6%		.24	.22	.18	.14	.18
Total Cost without Owner Supervision		.96	.96	.76	.55	.68
Returns per Box:						
Returns from Fruit		1.14	1.13	.90	.72	.95
Net Returns		.18	.17	.14	.17	.27
Returns above Operating Cost		.42	.39	.32	.31	.45

* Returns not yet available.
Source: Growers cooperating with Florida Agricultural Extension Service and Experiment Stations, Gainesville, Florida.

sons was $2,321 per acre. There were seven of these seasons, or 27 percent, when 6 percent interest or less was realized on the low grove investment figure placed on these groves for that particular season by the operators for long-time fruit producing purposes.

PRES. CONNER NAMES EIGHT MUTUAL DIRECTORS

Florida Citrus Mutual President Vernon L. Conner, Mt. Dora, has appointed eight Mutual board of directors committees to serve during the 1959-60 season.

Conner appointed two new committees to serve the industry and the grower. These are the Basic Research and Marketing Committee and the Citrus Commission Policy Coordination Committee.

Conner said J. R. "Rip" Graves, Florida Citrus Commission chairman, has been asked to appoint a committee similar to Mutual's Citrus Commission Policy Coordination Committee.

"These two committees will coordinate policies and activities of the two organizations so that the grower may receive full value for the money he invests in these organizations," Conner said.

Other Mutual committees and their chairmen:

Budget and Audit, W. M. Acree, DeLand; Charter, By-Laws and Contracts, J. J. Parrish, Jr., Titusville; Grower and Public Relations, James A. B. Michael, Wabasso; Grapefruit Cultural Practices and Quality, C. F. Fawsett, Jr., Orlando; Basic Research and Marketing, W. M. Acree; Citrus Commission Policy Coordination Committee, Conner, Morton and Acree; and Executive Committee.

Members of Mutual's Executive Committee are: Ford W. Moody. Palm Harbor; W. M. Acree; C. F. Fawsett, Jr.; A. B. Michael; John W. Parker, Arcadia; James C. Morton, and Conner.

STATE OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946, OF THE CITRUS INDUSTRY, PUBLISHED MONTHLY AT BARTOW, FLORIDA, FOR OCTOBER, 1959.

STATE OF FLORIDA,
COUNTY OF POLK.

Before me, a notary public in and for the State and County aforesaid, personally appeared S. Lloyd Frisbie, who having been duly sworn according to law, deposes and says that he is the Editor of The Citrus Industry and that the following is to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation) etc. of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March, 1922, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher — Associated Publications Corp., Bartow, Fla.

Editor—S. Lloyd Frisbie, Bartow, Fla.

Business Manager — S. Lloyd Frisbie, Bartow, Florida.

2. That the owners are:

Associated Publications Corporation, Bartow, Florida.

S. Lloyd Frisbie, Bartow, Fla.
Loyal Frisbie, Bartow, Fla.
Richard R. Frisbie, Bartow, Fla.
Mrs. Clara Frisbie, Bartow, Fla.
B. L. Gable, New York, N. Y.
F. L. Skelly, Orlando, Fla.
B. W. Skinner, Dunedin, Fla.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holders appears upon the books of the company as trustee or in any other fiducary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold than that of a bona fide owner.

Sworn to and subscribed before me this 1st day of October, 1959.

S. LLOYD FRISBIE, Bus. Mgr.
MARY H. DUNSTON, Notary Public
My commission expires Nov. 1, 1960.

The LYONIZER

COMPILED BY THE LYONS FERTILIZER COMPANY

Reports Of Our Field Men . . .

NORTH CENTRAL FLORIDA

V. E. Bourland
Winter Garden, Fla.
Phone 107

We are having hot, rainy weather with electrical storm this afternoon. Water standing in places I haven't seen in years, lakes are still rising, and low land groves are being hurt by water in spite of growers ditching. Cover crops are being cut where they can get into groves with equipment. Fruit has sized up very nicely.

Different kinds of scale is showing up in lots of groves. All young trees have made a wonderful growth, and cover crops have been excellent.

A little grapefruit is being picked. Very little truck farming on account of rain. High land pastures are good, but lots of low land has been covered with water, however cattle are looking good.

SOUTH HILLSBOROUGH, MANATEE AND SARASOTA COUNTIES

Eaves Allison
P. O. Box 365, Sarasota, Fla.
Phone Fulton 8-2611

The big news at this time is on the water front. After about seventy-five consecutive days of rain we really had one yesterday, Sept. 16th, from five to seven inches in twenty-four hours. All over this area. You probably saw some of the flood pictures. And we thought we were bad off before! I saw some young trees with just the tops showing above water.

Well, we are sure of one thing, our trees are living on borrowed time right now! This is borrowed time that we can pay back though, with plenty of that good Lyons Fertilizer to replace the plant food that has been leached away by the continuing rains of this period.

It is apparent to most citrus growers that their trees have been living on water for the past month or so, and they know that just as soon as the rains stop their trees will begin to decline pretty rapidly unless there is something right there ready for them to pick up. It will be a good idea to lay plans for an extra early application of fall fertilizer to do this job. Be ready to put it on as soon as the rains stop and the ground dries out sufficiently. We hope!

I am going to end this report right here, as the tomato growers and fall vegetable men are having a hard enough time without being wrote about!

NORTH CENTRAL FLORIDA

L. D. Geiger, Jr.,
Phone STATE 7-3952
Leesburg, Fla.

In North-Central Florida as in most parts of the state we are having just a little bit of rain, usually everyday.

In this area most of the growers are trying to cut the cover crops in, that is between rains. Also there is quite a bit of spraying being done now. The rust mite and, in some places, scale are beginning to build up. This build up seems to follow the cutting down of the cover crop.

In the Webster area the growers are getting ready for their fall crops. But in that area also there is quite a problem with the great amount of water.

SOUTH POLK, HIGHLANDS, HARDEE AND DeSOTO COUNTIES

C. R. Wingfield
Phone: Glandale 2-8181
Avon Park, Fla.

As of the writing of this article (Sept. 20th) there appears to be moving into the state a mass of cooler air that might change the weather pattern for this section of the state. However, up to this time it has not been a matter of getting wetter but of getting deeper. Many groves still have the cover crop standing and it is time for this to be down and worked into the soil. Use the chopper where possible and then go to the disk.

Early fruit is still breaking color and as it has reached a good size it should not be long before shipments can be made. Certainly before the normal shipping dates. Grapefruit is acting the same and is being moved into the markets.

While the trees are looking good at this time it is noticed that some foliage has begun to show signs of deficiency of nitrogen, magnesium and manganese. Close observation of groves should be maintained and ample plant food supplied and do not sell magnesium short at this time. Consideration should be given to the need of some quick acting (Nitrate) Nitrogen to water damaged trees.

Vegetable growers are still fighting weather conditions and we feel the usual vegetable tonnage will be way below normal. Cukes, Peppers, Tomatoes and Egg Plants have suffered from the rains.

HIGHLANDS AND POLK COUNTIES

R. E. Lassiter, Jr., & R. S. Carlin
P. O. Box 1304
Winter Haven, Fla.

Growers at this time are beginning to concern themselves with the Fall fertilizer application. We feel that in doing this growers should consider the above normal rainfall and leaching which we have experienced throughout the Spring and Summer. Due to the excessive leaching of much of the plant food and, especially where the trees are holding heavy crops, it would be wise to apply extra fertilizer poundages in order to compensate for this plant food loss and better assure a good crop set for the following year.

In those areas where there has been water damage it should be kept in mind that these trees will not be able to handle as much fertilizer as they have normally been given at this time because of root damage.

We are already noticing some deficiency patterns to be present in the groves at this time. This is principally due to the rapid growth, slow up-take and leaching of some of the minor and secondary elements from the soil.

Growers who have Rust Mite problems at this time should take the other mites and scale into consideration when working out their spray programs.

HOW TO HANDLE THE FALL AND WINTER MITE PROBLEM

(Continued from page 16)

tion. Less effective and sometimes less expensive materials may profitably be used if a second application is planned for the dormant season or if the first treatment is not needed until after November.

Time intervals between applications and harvest have been established for all miticides that may be used on bearing trees. These intervals may be found on labels. They must be observed in order to prevent excessive residues at harvest.

Tedion.—This miticide presents no known hazard to the user and is compatible with other materials used on citrus. **It must not be used where there is fruit.** This confines the use of Tedion to nursery stock, non-bearing trees, or to bearing trees only after the entire crop has been picked. Tedion will give the longest period of control of purple and Texas citrus mites of any known miticide, but it will not control rust mite and must be used with zineb, Chlorobenzilate or sulfur.

Recommended dosage: 0.5 lb. of Tedion 25W per 100 gallons in thorough coverage sprays only.

Trithion.—Where Tedion has given mite control from September to post-bloom or longer, Trithion has lasted until February. However, Trithion has often given excellent control of purple mite, Texas citrus mite, and rust mite from November until post-bloom. Such results may be expected from a thorough application made in November or later unless a severe mite outbreak develops. No rust mite miticide is needed with Trithion. This material is preferable to others where long control is expected from October and November sprays and Tedion cannot be used.

Trithion should not be used on grapefruit to be sold as fresh fruit because it may produce grade-lowering green spots. Trithion has not blemished other varities of citrus.

Recommended dosage: 0.5 pint of Trithion 4 Flowable or 1.0 lb. of Trithion 25W per 100 gallons in thorough coverage sprays only.

Kelthane.—Kelthane is less effective than Trithion against purple mite, Texas citrus mite, and citrus rust mite. Yet, it too has given control of all three species from November until post-bloom. In general, early fall applications are likely to need retreatment before post-bloom, especially if the winter is warm, but sprays applied after December should last until post-bloom.

Recommended dosage: 1.0 pint of Kelthane EC (increase to 1.5 in warm weather) per 100 gallons in thorough coverage sprays only. Kelthane should not be used in alkaline sprays.

Delnav.—Although somewhat more effective than Kelthane against rust mite, Delnav is slightly less effective against purple mite. These differences, however, have not been very great in fall and winter sprays except where purple mite was especially persistent. Both are superior to DN Dry Mix No. 1 and both may be used without a supplemental rust mite miticide.

Delnav has one drawback that is not shared by other miticides. Post-bloom applications have a distinct tendency to increase red scale. This tendency seems to be less pronounced in summer sprays and has not occurred following fall applications. Nevertheless, Delnav should not be used in the fall and winter where red scale is very numerous.

Recommended dosage: 1.0 pint of Delnav Liquid-2 per 100 gallons in thorough coverage sprays only.

Systox.—Systox is more effective than DN Dry Mix No. 1 and only slightly less effective than Kelthane. It does not control rust mite. This is a hazardous material.

Recommended dosage: 0.5 pint (1.0 pint in warm weather) per 100

Johnston

Padgett

The new Griffin Fertilizer plant at Frostproof was opened on Sept. 29 with an open house celebration to which citizens of the area were guests.

Ben Hill Griffin, Jr., states that the new plant is completely modern and production capacity sufficient for all needs.

E. R. Johnston who has recently served as manager of the fertilizer division of Minute Maid is manager of the new plant.

Johnston will be assisted in sales by R. L. (Smoky) Padgett who has headed Griffin's grove caretaking operatons for the past 10 years.

Ray Joyner who has operated a fertilizer plant in Winter Haven will also be a member of the staff, while M. J. Thompson, who has been in the fertilizer business for many years, will serve as office manager and bookkeeper.

Refreshments were served and prizes were given away during the open house celebration.

Thompson

Joyner

gallons in thorough coverage sprays only.

DN Dry Mix No. 1.—DN Dry Mix is the least effective of the miticides, especially during rainy weather, and does not control rust mite. It must be supplemented with sulfur or Chlorobenzilate. The mixture of DN and zineb is not recommended because it not only does not last as long as DN + sulfur or Chlorobenzilate, but it causes a pronounced abnormal increase in purple mite at the end of the control period. Do not use DN with oil or in alkaline solutions.

Recommended dosage: 0.66 lb. of DN Dry Mix No. 1 in thorough coverage sprays only.

GUIDE TO THE SELECTION OF AIR COMPRESSORS AND ELECTRIC GENERATORS TO OPERATE POWER PRUNING TOOLS

(Continued from page 18)

holds the suction valves open when the top pressure is reached. This pressure is pre-adjusted manually by the operator according to the requirements of the pruning tools. The compressor should have sufficient capacity to unload occasionally under maximum working conditions. This permits cool air to be alternately drawn into and discharged from the cylinders and will result in cooler operation for both compressor and engine.

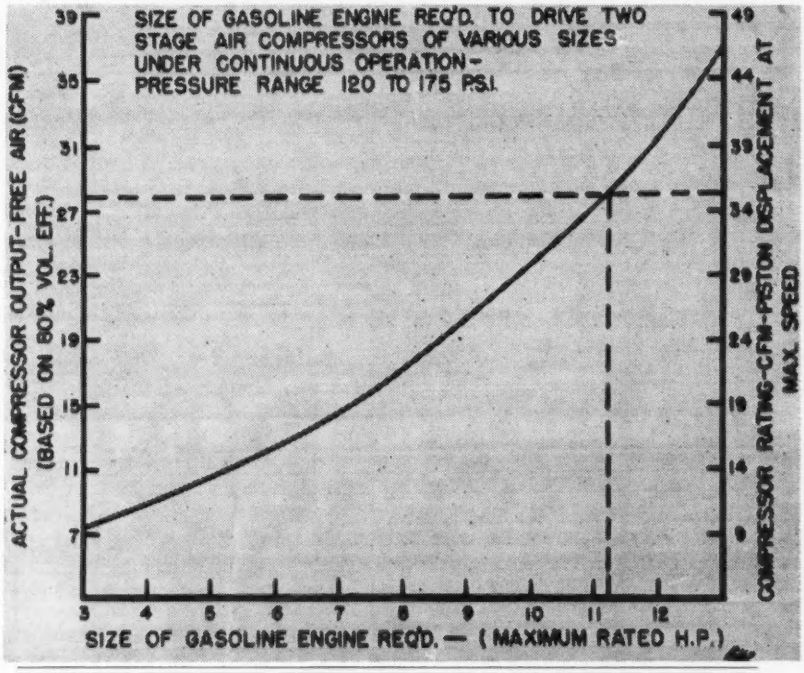
An air-line oiler must be installed on the outlet side of the receiver tank. This provides for continuous lubrication of the prunning tool.

The air consumption of pneumatic tools depends not only upon their size and operating conditions, but also upon leakage, hose wear, etc. Figure 1 gives the relationship between compressor rating, actual compressor output and horsepower requirements for operating pressures between 120 and 175 p.s.i.

For example, if an operator desires to work simultaneously a pneumatic lopper requiring 8 c.f.m. at 135 p.s.i. and a circular saw requiring 20 c.f.m. free air at 135 p.s.i. with a total of 28 c.f.m. free air, a line is drawn from the 28 c.f.m. point on the left, horizontally across, to give us a compressor displacement rating of 35 c.f.m. Where the line meets the curve, a vertical line is drawn to obtain the horsepower value of the engine required to drive the compressor (in this case 11 to 12 H.P.)

Typical specifications for an engine to satisfy the above requirements would be as follows:

7.7 horsepower at 1600 rpm
9.2 horsepower at 1800 rpm
10.2 horsepower at 2000 rpm
10.9 horsepower at 2200 rpm
11.5 horsepower at 2400 rpm
11.9 horsepower at 2600 rpm
12.2 horsepower at 2800 rpm
12.4 horsepower at 3000 rpm
12.5 horsepower at 3200 rpm



By operating this engine at 3200 r.p.m., 12.5 H.P. would be available for driving the compressor; this would afford a satisfactory margin of safety.

The next step is to use the right size pulley on the engine to obtain the recommended r.p.m on the compressor. If the compressor manufacturer specifies maximum rated r.p.m. at say 800, the speed ratio will be 3200/800 = 4 to 1.

If the compressor comes equipped with a 16" pitch diameter pulley, the engine should therefore have a 4" or (16"/4) pulley, with the same number of grooves and the same section as that of the compressor pulley.

The length of the belts can be determined by the following formula:
Length = 1.6 (D_1 + D_2) + 2C
Where D_1 = pitch diameter of compressor pulley
D_2 = pitch diameter of engine pulley
$_2C$ = center distance between the two shafts.

When laying out the drive, allowance should be made for a small increase or decrease in center distance which may be needed to accommodate the belt of nearest stock length. This can be done by the use of a belt tightener or by mounting the engine on a sliding base.

A speed indicator should be used on the compressor shaft in order that the engine governor might be set correctly.

The majority of operators usually purchase the compressor assembly in one complete unit. The only specifications necessary in this case are the following:

*1. P.T.O. or engine driven.
2. Operating pressure range.
3. Compressor displacement rating.

²The center distance is usually made somewhat larger than the diameter of the larger pulley, but less than the sum of the diameter of the large and small pulleys.

*If P.T.O.-driven, specify whether 540 or 1000 r.p.m.

$3,000,000 ADVERTISING PROGRAM LAUNCHED BY 22 PRODUCERS

The biggest coupon campaign and most comprehensive advertising and promotional drive in food marketing history begins this week when some 22 producers of Florida frozen orange concentrate launch a three-month, $3,300,000 program designed to attract new users to the product as well as increase present levels of consumption, it was announced here today.

According to Frank D. Arn, director of advertising and merchandising for the Florida Citrus Commission and coordinator of the program, it will be divided into three separate and distinct phases. The first phase will feature a coupon worth 12 cents to each consumer on the purchase of four 6-ounce cans or two 12-ounce cans of any brand of Florida frozen orange concentrate.

The newspaper campaign will be backed early in October with double-page spreads in LIFE, LOOK and SATURDAY EVENING POST. These powerful magazines will make 18,500,000 more coupons available to the public.

Classified Ads

"ORTHO® spray materials assure me of better application"

"ORTHO spray materials have given the smoothest mixes tank after tank, assuring me of better application," reports Bill Sachsenmaier of Sachsenmaier Groves at Avon Park, Florida (pictured above, right, with ORTHO Fieldman Joe Murphy). "And, I place a high value in the way ORTHO people take a sincere interest in my groves. Their deliveries have always been punctual and prompt and their field service timely."

Leading Florida Citrus Growers acclaim ORTHO field service and products. Here's why: When you buy ORTHO products, all the personal, on-your-ground technical advice and services of your ORTHO Fieldman are provided gladly and without any extra charge. Too, with ORTHO, you're associated with the company that first developed highly refined petroleum oil sprays in the form of new type emulsions and ready-mixes. This scientific research and technical experience have made ORTHO Field Service and products the choice of Florida citrus growers for over 34 years.

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A subsidiary of California Chemical Co.
P. O. Box 7067, Orlando, Florida

T. M. REG. U. S. PAT. OFF.: ORTHO ON ALL CHEMICALS. READ DIRECTIONS AND CAUTIONS BEFORE USE.

Contact your nearest ORTHO Fieldman today:

Lake Alfred: J. S. Murphy, Jr. • Lakeland: Jean E. Mabry • Leesburg: Charles Ashley
Orlando: Cliff Sutton • Orlando: John Nowell • Deland: Randall Williams • Plant City: Webster B. Carson

A GREAT MANY OF FLORIDA'S MOST SUCCESSFUL GROWERS HAVE FOUND FROM EXPERIENCE THAT

LYONS FERTILIZERS PRODUCE MAXIMUM CROPS OF FINEST QUALITY

LYONS FERTILIZER COMPANY

PHONE 43-101

TAMPA, FLORIDA